CLAIMS

1. Method for detecting at least one Mycobacterium strain in a sample, comprising:
   (i) providing at least one Mycobacterium species-specific upstream p34 gene region (us-p34) nucleotide probe,
   (ii) reacting said us-p34 nucleotide probe with said sample under conditions that allow for the selective formation of nucleotide duplexes between said us-p34 nucleotide probe and a corresponding Mycobacterium nucleic acid target present in said sample, and,
   (iii) detecting any nucleotide duplexes containing said us-p34 nucleotide probe.

2. Method according to claim 1 wherein said Mycobacterium species-specific us-p34 nucleotide probe specifically hybridizes with at least part of a sequence selected from SEQ ID NOs 57 to 74, or the complement thereof, or the corresponding sequences wherein T has been replaced by U.

3. Method according to claim 1 wherein said Mycobacterium species-specific us-p34 nucleotide probe is selected from the group of sequences represented in SEQ ID NOs 8 to 54 and SEQ ID NOs 57 to 74, or the complement thereof, or the corresponding sequences wherein T has been replaced by U.

4. Method for the differential detection of Mycobacteria in a sample, comprising:
   (i) providing at least two distinct Mycobacterium species-specific us-p34 nucleotide probes,
   (ii) reacting said us-p34 nucleotide probes with said sample under conditions that allow for the selective formation of nucleotide duplexes between said us-p34 specific nucleotide probe and a Mycobacterium nucleic acid present in said sample,
   (iii) detecting any nucleotide duplexes containing said us-p34 nucleotide probe, and,
   (iv) inferring from the nucleotide duplex formed, the presence and the identification of a specific Mycobacterium strain.

5. Method according to claim 4 wherein said Mycobacterium species-specific us-p34 nucleotide probes are selected from the group of sequences represented in SEQ ID NOs 8 to 54 and SEQ ID NOs 57 to 74.

6. Method for detecting at least one Mycobacterium strain in a sample, comprising:
   (i) providing at least one suitable primer pair comprising a sense or antisense Mycobacterium species-specific us-p34 primer,
   (ii) reacting said us-p34 primer pair with said sample under conditions that allow for the selective amplification of an us-p34 sequence in a Mycobacterium nucleic acid present in said sample, and,
   (iii) detecting the amplified product of step (ii), and,
   (iv) inferring from the amplification product the presence and the identification of at least one specific Mycobacterium strain.

7. Method according to claim 6 wherein the sense or antisense Mycobacterium species-specific us-p34 primer is selected from the group of sequences represented in SEQ ID NOs 8 to 54.

8. Method for the differential detection of mycobacteria in a sample, comprising:
   (i) providing at least one suitable us-p34 primer pair containing a sense or anti-sense us-p34 primer,
   (ii) reacting said us-p34 primer pair with said sample under conditions that allow for the selective amplification of us-p34 sequences of at least one Mycobacterium nucleic acid present in said sample,
   (iii) detecting the amplified product of step (ii), and,
   (iv) inferring from the amplified product formed, the presence and the identification of at least one (specific) Mycobacterium.

9. Method according to claim 8 wherein said us-p34 primer pair is selected from the group of sequences represented in SEQ ID NOs 1 to 54.

10. Method for the detection of MAC complex Mycobacterium species in a sample, comprising:
   (i) providing at least one us-p34 probe selected from the group of sequences represented in SEQ ID NOs 8, 14, 15, 22, 27, 28, 29, 34, 35, 50, 51, 57, 68, and 73,
   (ii) reacting said us-p34 probe with said sample under conditions that allow for the selective formation of nucleotide duplexes between said us-p34 nucleotide probe and a MAC complex Mycobacterium nucleic acid target in said sample, and,

(iii) detecting any nucleotide duplexes containing said us-p34 nucleotide probe.

11. Method for the detection of MOTT Mycobacterium species in a sample, comprising:
(i) providing at least one us-p34 probe selected from the group of sequences represented in SEQ ID NOs 9 to 13, 16 to 21, 24, 25, 26, 30 to 33, 36 to 47, 49, 53, 54, 59 to 64, 67, 69 to 72 and 74,
(ii) reacting said us-p34 primer probe said sample under conditions that allow for the selective formation of nucleotide duplexes between said us-p34 nucleotide probe and a MOTT Mycobacterium nucleic acid target in said sample, and,
(iii) detecting any nucleotide duplexes containing said us-p34 nucleotide probe.

12. Method for detecting new us-p34 sequences in a sample, comprising:
(i) providing at least one suitable primer pair comprising a sense and anti-sense us-p34 primer selected from the sequences represented in SEQ ID NOs 1 to 7,
(ii) reacting said us-p34 primer pair with said sample under conditions that allow for the amplification of an us-p34 sequence in a Mycobacterium nucleic acid target in said sample, and,
(iii) determining the sequence of the amplification product obtained in (ii).

13. Method for the differential detection of mycobacteria in a sample, comprising:
(i) providing at least one suitable primer pair comprising a sense and anti-sense us-p34 primer selected from SEQ ID NOs 1 to 7,
(ii) reacting said us-p34 primer pair with said sample under conditions that allow for the amplification of an us-p34 sequence in a Mycobacterium nucleic acid target in said sample,
(iii) selectively hybridizing the amplification products obtained in (ii) with at least one Mycobacterium species-specific us-p34 nucleotide probe selected from the group of sequences represented in SEQ ID NOs 8 to 74,
(iv) detecting any nucleotide duplexes containing said Mycobacterium species-specific us-p34 nucleotide probe, and,
(v) inferring from the nucleotide duplex formed, the presence of a specific Mycobacterium species.

14. A Mycobacterium species-specific us-p34 nucleotide probe or primer comprising at least 8 contiguous nucleotides from one of the nucleic acid sequences represented in SEQ ID NOs 57 to 74, or the complement thereof, or the corresponding sequences wherein T has been replaced by U.

15. The Mycobacterium species-specific us-p34 nucleotide probe or primer of claim 14 selected from the sequences as represented in SEQ ID NOs 8 to 54.

16. A Mycobacterium us-p34 nucleotide primer selected from the sequences as represented in SEQ ID NOs 1 to 7.

17. A nucleic acid comprising a sequence selected from SEQ ID NOs 8 to 54, 57 to 64, 66, 67 and 69 to 74.

18. A composition comprising at least one nucleotide probe, primer or sequence according to any of claims 14 to 17.

19. A diagnostic kit comprising a probe, primer or sequence according to any of claims 14 to 17 or a composition according to claim 18.

20. A solid support for the detection of mycobacteria comprising fixed to said support at least two capture probes selected from SEQ ID NOs 1 to 54 and 57 to 74.

21. A solid support according to claim 19 for use in a method of any of claims 1 to 5 or 13.

22. A method for differentiating between Mycobacterium bovis and Mycobacterium tubercolusosis in a sample, comprising:

(i) providing at least one us-p34 probe selective for Mycobacterium bovis or Mycobacterium tuberculosis wherein said probe is SEQ ID NO 66 for Mycobacterium bovis or SEQ ID NO 65 for Mycobacterium tuberculosis,

(ii) reacting said us-p34 nucleotide probe with said sample under conditions that allow for the selective formation of nucleotide duplexes between said us-p34 nucleotide probe and a corresponding Mycobacterium bovis or tuberculosis nucleic acid target present in said sample, and,

(iii) detecting any nucleotide duplexes containing said Mycobacterium bovis or tuberculosis specifc us-p34 nucleotide probe.

23. A method for differentiating between Mycobacterium bovis and Mycobacterium tubercolusosis in a sample, comprising:

(i) providing at least one suitable primer pair comprising at least one sense or antisense us-p34 primer selective for Mycobacterium bovis or Mycobacterium tuberculosis wherein said primer is SEQ ID NO 66 for Mycobacterium bovis or SEQ ID NO 65 for Mycobacterium tuberculosis,

(ii) reacting said us-p34 primer pair with said sample under conditions that allow for the selective amplification of Mycobacterium bovis and/or Mycobacterium tuberculosis nucleic acid target present in said sample, and,

(iii) inferring from the reaction product(s) the presence of Mycobacterium bovis and/or Mycobacterium tuberculosis in said sample.

24. A method for differentiating between Mycobacterium avium and Mycobacterium avium subspecies paratuberculosis in a sample, comprising:

(i) providing at least one us-p34 probe selective for Mycobacterium avium and Mycobacterium avium subspecies paratuberculosis wherein said probe is selected from the sequences represented in SEQ ID NOs 8, 27 to 29, 50 or 58 for Mycobacterium avium or SEQ ID NO 68 for Mycobacterium avium subspecies paratuberculosis ;

(ii) reacting said us-p34 nucleotide probe with said sample under conditions that allow for the selective formation of nucleotide duplexes between said us-p34 nucleotide probe and a corresponding Mycobacterium avium and Mycobacterium avium subspecies paratuberculosis nucleic acid target present in said sample, and,

(iii) detecting any nucleotide duplexes containing said Mycobacterium avium and Mycobacterium avium subspecies paratuberculosis specifc us-p34 nucleotide probe

25. A method for differentiating between Mycobacterium avium and Mycobacterium avium subspecies paratuberculosis in a sample, comprising:

(i) providing at least one suitable primer pair comprising at least one sense or antisense us-p34 primer selective for Mycobacterium avium and Mycobacterium

avium subspecies paratuberculosis wherein said primer is selected from the sequences represented in SEQ ID NOs 8, 27 to 29, 50 or 58 for Mycobacterium avium or SEQ ID NO 68 for Mycobacterium avium subspecies paratuberculosis,

(ii) reacting said us-p34 primer pair with said sample under conditions that allow for the selective amplification of Mycobacterium avium and Mycobacterium avium subspecies paratuberculosis nucleic acid target present in said sample, and,

(iii) inferring from the reaction product(s) the presence of Mycobacterium avium and Mycobacterium avium subspecies paratuberculosis in said sample.